2019

An Operator's Perspective: Leveraging Education for SOF Advantage

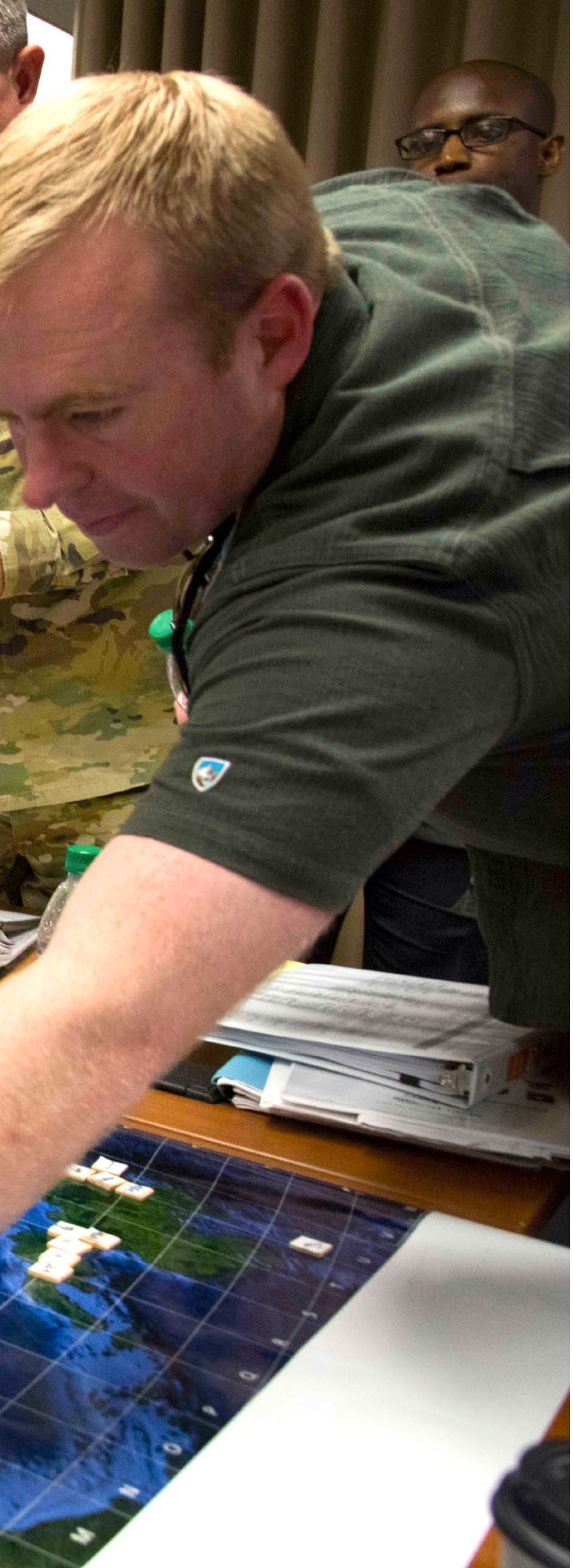
Monterey, California. Naval Postgraduate School

AN OPERATOR'S PERSPECTIVE

Leveraging Education for SOF Advantage

"Advanced military professional education is the key enabler for unleashing America's comparative advantage against our adversaries. That comparative advantage is you – the American military leader."

-Vice Adm. P. Gardner Howe, NPS Alumnus
NPS Commencement Speech, Sept 14, 2018



PRESIDENT'S MESSAGE

Dr. Ann Elisabeth Rondeau
Vice Adm., U.S. Navy (Ret.)
President, Naval Postgraduate School

At NPS, we are proud to be a partner with the United States Special Operations Command (USSOCOM) and each Services' Special Operations Forces (SOF) Component Command. USSOCOM and the SOF Components provide NPS a clear link to the Joint Warfighting community. SOF enables the campus community to remain aware of cutting edge Joint and Allied military efforts to promote peace and stability in this era of Global Competition.

In return, through our education and applied research capabilities, NPS assists SOF by building a corps of leaders who ask fundamentally different questions about the nature of Global Competition, think differently about the application of the military instrument, and can effectively lead the Joint Force under the conditions of ambiguity which is commonly below the threshold of large-scale combat operations. Our work in support of SOF is well integrated with NPS' broader mission to serve as DoD's principle platform for innovation and experimentation. Just as this work was foundational for the refinement of SOF capabilities for the Global War on Terror, today's efforts are crucial for SOF to assist the Joint Force in designing and leading integrated campaigns that achieve the National Security and National Defense Strategy objective of winning in the Competition space below the threshold of armed conflict.

The following narratives demonstrate many of the means by which NPS education and research support SOF, but more importantly, exemplify how the individual SOF leaders studying at NPS leverage the resources available to them in order to develop customized education and research outcomes. Ultimately, these outcomes provide SOCOM and the SOF Components a triple return on their investment – research outcomes addressing acute and chronic challenges; subject matter expertise relevant to SOF's mission set; and leaders with refined analytical, critical thinking, and ethical decision-making skills for leadership in this era of Global Competition.

NPS is alongside and in alignment with SOCOM and the SOF Component Commands, and through our partnership we are poised to deliver solutions to complex warfighting challenges. As we move forward in securing the future of our nation and Allies, the NPS-SOCOM partnership will be a vital strategic asset.

Very respectfully and in abiding service,

OUR MISSION

The Naval Postgraduate School provides relevant and unique advanced education and research programs to increase the combat effectiveness of commissioned officers of the naval service to enhance the security of the United States. In support of the foregoing and to sustain academic excellence, NPS will foster a program of relevant and meritorious thesis and research experiences for NPS students that informs the curricula, supports the needs of Navy and Department of Defense, and builds the intellectual capital of NPS faculty. To support the core Navy mission, NPS' programs are inherently joint, inter-agency, and international.

- NPS Mission Statement

DEFENSE ANALYSIS *at* NAVAL POSTGRADUATE SCHOOL

Overview

The Mission of the Defense Analysis Department is to foster critical thinking skills and specialized knowledge needed for waging and prevailing in today's complex conflicts and those to come.

The Defense Analysis (DA) department at the Naval Postgraduate School hosts U.S. Special Operations Command's Irregular Warfare and Special Operations advanced education program for SOF leaders. The program is one of the largest in resident programs at NPS. The Special Operations and Irregular Warfare curriculum focuses on counterinsurgency, terrorism and counterterrorism, unconventional warfare, information operations, and other "high leverage" operations in U.S. defense and foreign policy. The core program also provides a strong background in strategic analysis, decision modeling, organization theory, and formal analytical methods.

Three Critical Elements to Defense Analysis at NPS

People + Infrastructure + Learning Environment = Optimal Educational Outcomes

People

- Average of 150+ SOF & Conventional Officers & NCOs enrolled
- 25% International SOF Officers
- A community of prominent faculty dedicated to the study of security and defense
- A student body of highly Empowered and Experienced Military and Interagency Practitioners

Infrastructure

- World Class Education and Research Facilities and Material Resources

Learning Environment

- Customized paths of study and research empowers Leaders to optimize their educational outcomes

What to expect from NPS graduates

- Prepared for Command – Leaders who understand SOF's Strategic Utility to the Nation
- Knowledgeable – identify and contextualize problems
- Analytical - dissect problems in order to propose unique solutions
- Articulate – effective in conveying both the problem and solutions to senior leaders and policy makers

AN OPERATOR'S PERSPECTIVE

Major Philip Swintek, U.S. Army, Special Forces

> *"I leveraged my NPS research from the SOJTF-A study to support ongoing peace talks with the Taliban developing courses of action for the anticipated reconciliation and reintegration of former combatants back into local Afghan communities."*

Major Philip Swintek,
U.S. Army Special Forces
Master's in Defense Analysis

I approached NPS as a once in a career opportunity that I would leverage for all its worth to grow as an officer, leader, and man. My focus on technology led me to a earn dual Master's Degrees in Defense Analysis and Space System Operations. The unique mix of working with the academic experts in these two seemingly different yet interconnected fields exposed me to a broad range of technological experts, retired astronauts, world-renowned defense analysis experts, and interagency professionals. Mixing the two disciplines allowed me to learn in depth about the space systems technology that special operations forces (SOF) use to great effect. Through a research fellowship with Space and Naval Warfare Systems Command (SPAWAR), I applied what I learned from those disciplines to research, create, and test a satellite communications payload with the specific intent to support ground force operations in signals denied areas. As a Fellow, my association with SPAWAR enabled me to get an audience of more than 1,000 aerospace professionals, including directors of National Reconnaissance Office, presenting alternative solutions for providing the most recent communications technology to SOF across the modern battlefield.

As a second focus of my NPS studies, I analyzed our military's role in support of American foreign policy in Afghanistan. Specifically, I worked with a team of students and scholars to conduct a holistic assessment of the future utilization of SOF in Afghanistan beyond the year 2020. The study took me to Afghanistan for research resulting in the presentation of our conclusions to the incoming Special Operations Joint Task Force-Afghanistan (SOJTF-A) Commander in April 2018. After graduation, I returned to Afghanistan where my NPS education continued to pay dividends. I leveraged my NPS research from the SOJTF-A study to support ongoing peace talks with the Taliban developing courses of action for the anticipated reconciliation and reintegration of former combatants back into local Afghan communities. These experiences were invaluable because they exposed me to strategic level analysis, taught me operational design principles, and gave me a deep understanding of the complexity of Afghans, Afghanistan and the region. Additionally, the deep understanding of this complex environment allows me to better integrate and align the SOTF-A staff and our subordinate commands' efforts into the ongoing whole of government campaign during this incredibly complex period of the Afghan war.

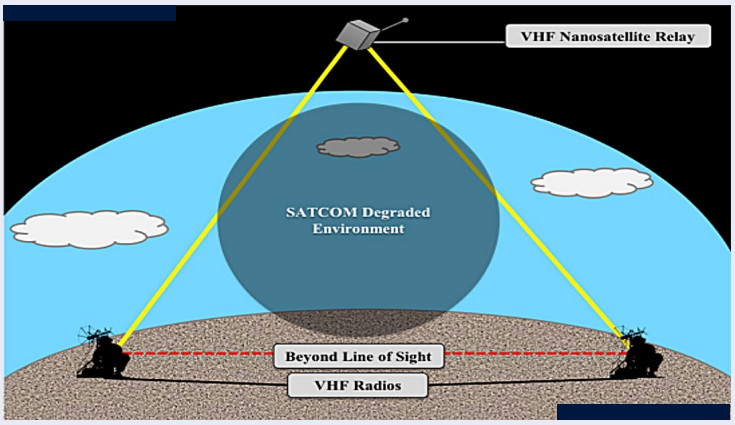
Since graduation, I also leveraged my NPS education and network of alumni and faculty to prepare my special forces company for deployment to Ukraine. We conducted an intensive "academic week"

that provided me and my subordinates critical insight to directly participate in the great power competition between the United States, our Allies, and Russia. The results of this week helped the Green Berets under my command appreciate the true threat posed by Russia and other near-peer competitors. During the deployment, my expertise in technology integration proved highly valuable in achieving interoperability with our interagency partners already in Ukraine. This smooth integration helped the company's intelligence fusion cell to direct national assets to great effect in the dynamic environment posed by the Ukraine theater of operations.

My NPS education has proven valuable for me and my Soldiers every day. I am now a true student of today's increasingly complex geopolitical climate with set of intellectual skills to bear to assist in solving the complex challenges we face as SOF.

STUDENT THESIS SPOTLIGHT

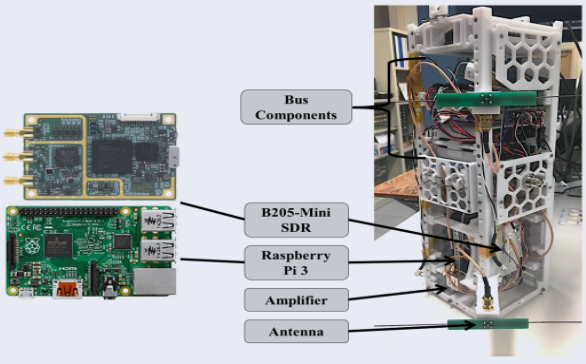
Critical Vulnerabilities in the Space Domain: Using Nanosatellites as an Alternative to Traditional Satellite Architectures



Today, the U.S. military relies upon space-based technology for a myriad of functions from precision navigation to satellite communication. Nanosatellites and cube satellites (CubeSats) are a low-cost and expedient solution to build redundancy and resiliency, offering unique options as a alternative to traditional satellite systems. This thesis explores an alternative: A Software Assisted VHF Information Overhead Relay-CubeSat (SAVIOR-CUBE). SAVIOR-Cube is a software defined radio (SDR) payload operating as a very high frequency (VHF) relay via a nanosatellite in low Earth orbit. This thesis demonstrates the depth of the problem a payload such as SAVIOR-Cube could solve, the applicability of nanosatellite solutions to U.S. forces today, and the results of extensive testing, culminating with a proof of concept high-altitude balloon (HAB) flight.

Testing and Results

- Successfully communicated across a simulated distance of 100 km during line of site field tests
- Functioned for 30 minutes at altitude during HAB flight, sending and receiving 14 separate transmissions
- Reached a maximum altitude of 21 km (70,000 ft)
- Communicated over a maximum slant-range of 36 km



A successful proof of concept test and design for a VHF nanosatellite relay

AN OPERATOR'S PERSPECTIVE

Major Eric Roles, U.S. Army, Special Forces

"I recognized that the NPS Defense Analysis (DA) program is the premier opportunity for an SF officer to become the SOF Soldier and scholar that our formations need."

Major Eric Roles,
U.S. Army, Special Forces
Master's in Defense Analysis

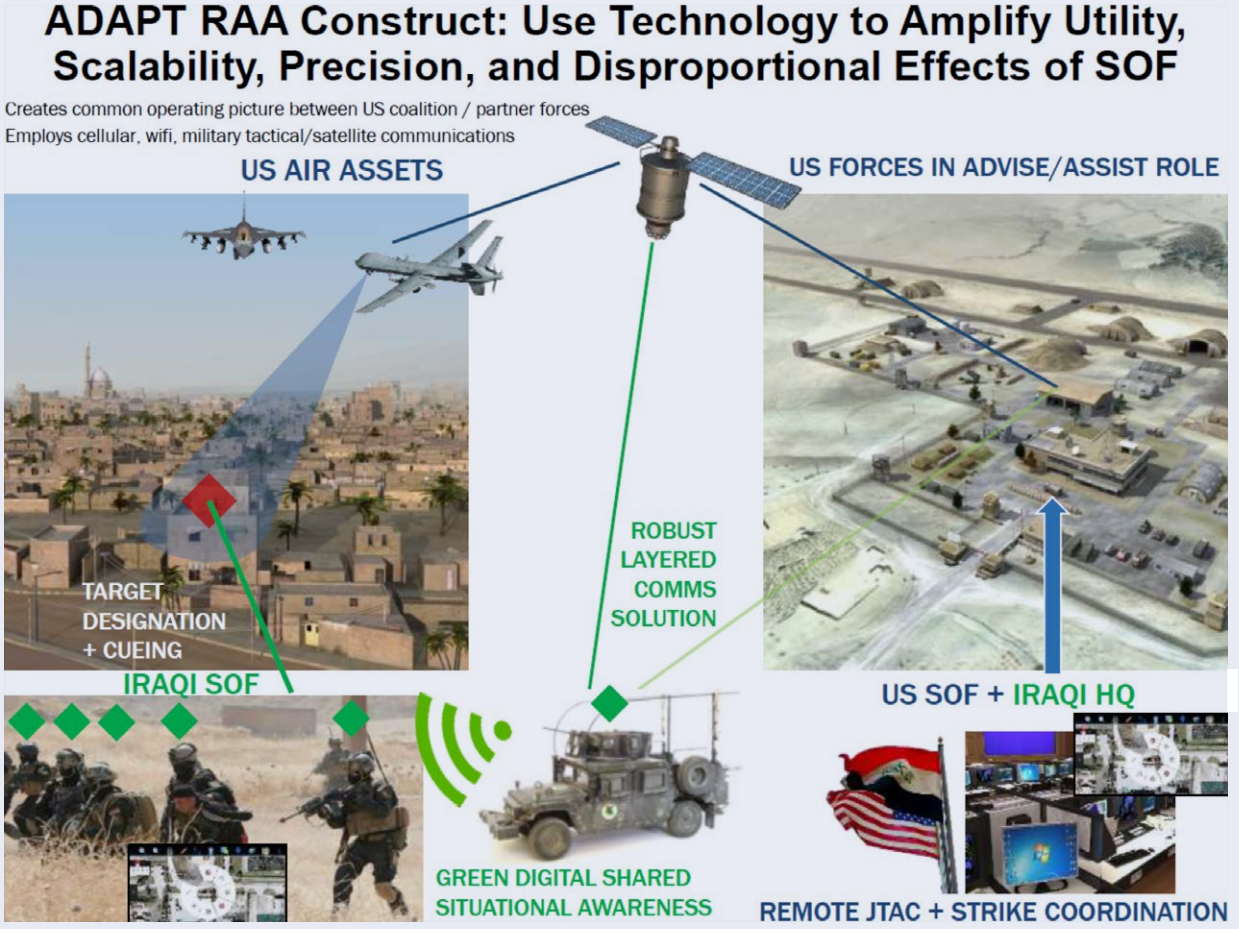
I am a true believer in the unique "operational education" model offered by Naval Postgraduate School's (NPS) Defense Analysis program. My mentor in Special Forces, Colonel Dean Newman, one of the "horse soldiers" who fought in Afghanistan from 2001-2002, graduated from NPS in 2003. Colonel Newman's operational experience sharpened by his NPS education, made him a warrior-scholar I still seek to become.

After a subsequent decade of combat deployments, and coming directly from countering the Islamic State in Iraq, I realized I was ready for NPS. I had verbal orders from leaders at Special Operations Command Central (SOCCENT) to utilize my studies at NPS to advance the "Remote Advise and Assist" (RAA) capabilities we had recently pioneered in Iraq to support Partner Force operations. With SOCCENT sponsorship, I built a team of students, faculty and staff to refine RAA as a system and method. Our team collaborated with DARPA, DTRA, JIEDDO, and the Countering Terrorism Technical Support Office (CTTSO) on this project. Together we our $2 million capstone project significantly improved RAA partnering capabilities, and directly impacted the outcome of the battle for Mosul, Iraq. MG John Brennan, former Special Operations Command-Central Chief of Staff, stated that the RAA capabilities refined by my NPS team were the deciding factor for Presidential approval to authorize the release of close air support and indirect fires authorities in support of the Iraqi Partner Force. Additionally, my team's effort laid the groundwork for a $13 million procurement of the RAA system in support of SOCCENT, a similar purchase for Special Operations Command Africa (SOCAF), and ultimately a transition of the capability into a fully funded program of record, named Advanced Digital Advisor Partnering Technologies (ADAPT).

After graduation, I had the opportunity to deploy my Special Forces company with the Special Operations Command-Africa RAA capability into the Sahel region of Africa. Using concepts developed by my NPS research team, we operationally tested a spiral called "tactical mapping" with our African partner force. This NGA-sponsored program supported our tactical mission planning and analysis by employing small drones that collected and disseminated geospatial information and imagery in near real time to both my company and the partner force. The system we validated in Africa evolved into a program in Afghanistan called Aerial Reconnaissance Tactical Edge Mapping and Imagery System (ARTEMIS), used by the Security Force Assistance Brigades (SFAB), to enable their conduct of distributed advisory operations using their brigade organic imagery collection assets.

I am thankful for the advice from Col. Newman to attend NPS. While on campus, I met more special operations soldiers like him, and I recognized that the NPS Defense Analysis (DA) program is the premier opportunity for an SF officer to become the SOF Soldier and scholar that our formations need. As a leader, I look forward to leveraging my NPS experience in support of the Army, Joint Force and SOF.

STUDENT THESIS SPOTLIGHT



> *…the RAA capabilities refined by my NPS team were the deciding factor for Presidential approval to authorize the release of close air support and indirect fires authorities in support of the Iraqi Partner Force."*

AN OPERATOR'S PERSPECTIVE

Major Paul Bailey, U.S. Marine Corps

"The NPS DA program was essential to my development as a SOF leader who now better understands the 'why,' the 'how,' and the 'when' for applying the military instrument of power and SOF's role in achieving national goals."

Major Paul Bailey,
U.S. Marine Corps
Master's in Defense Analysis

Studying in NPS's Defense Analysis (DA) Program was the most rewarding educational experience of my career. The experience has proven completely relevant to my service in MARSOC. NPS broadened my understanding of the strategic utility of SOF, expanded my professional network, and significantly enhanced my ability to lead special operations forces.

My studies reshaped the way I define foreign policy problems and conceptualize solutions to strategic challenges. NPS has broadened my understanding of the strategic utility of SOF and the critical differences between irregular and conventional forms of warfare helping me achieve greater insight into my role as a MARSOC leader.

The DA professors and military faculty provided me a key advantage by introducing me to retired and active duty senior military officers. These leaders included the Special Operations Joint Task Force-OIR Commander, a former Commandant of the Marine Corps, and a recently retired Commander of US Army Special Operations Command all of whom provided unparalleled perspective, information and assistance to my capstone research project. The DA network allows me access to diverse professionals, and perspectives, that I now routinely leverage for the advantage of MARSOC.

Upon my return to MARSOC, the credibility of my NPS research led the Component Staff to task me to "backbench" the Commander in support of his annual testimony to the Senate Armed Services Committee. Drawing on what I learned at NPS, I prepared sections of the commander's testimony and assisted his preparation for follow on meetings with primary committee staff members.

Building on my research and the knowledge gained supporting the general's testimony, I planned and executed MARSOC's first command-wide educational event - the 2019 Cognitive Raider Symposium. The Symposium enabled me to directly implement one of my recommendations from my NPS research. This event brought NPS faculty and MARSOC leaders together to explore the strategic utility of the command in great power competition and other complex adaptive operational environments. The Cognitive Raider Symposium is now an annual event conducted in partnership with NPS providing valuable insights to the Command Staff. Finally, in my role as the command's G5 Concepts officer, my NPS experience provided me the insight and skills to lead the implementation of MARSOF 2030, the commander's strategic vision of MARSOC.

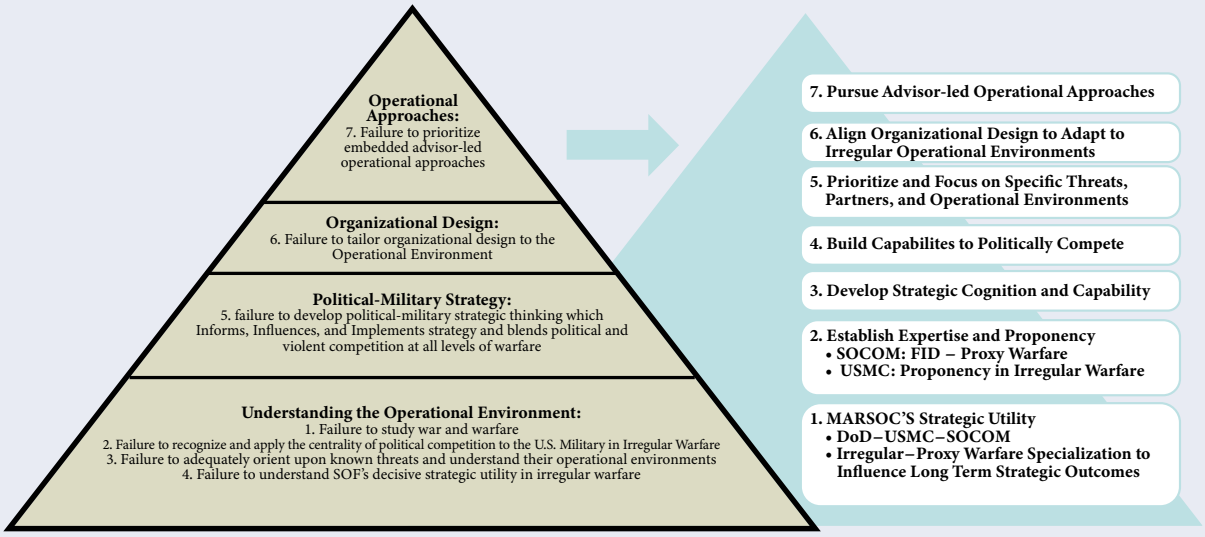
The relationships and knowledge gained at NPS, will last my entire lifetime, and will strengthen the global network of SOF professionals. The NPS DA program was essential to my development as a SOF leader who now better understands the 'why,' the 'how,' and the 'when' for applying the military instrument of power and SOF's role in achieving national goals.

STUDENT THESIS SPOTLIGHT

Relational Maneuver: How to Wage Irregular Warfare and MARSOC's Strategic Application

Background, Question, Argument

The 2018 National Defense Strategy shows that great powers and extremist organizations alike are employing irregular methods to undermine the United States and its allies. Based on historical lessons learned and internal organizational analysis, this thesis seeks to provide Marine Special Operations Command (MARSOC) with implementable recommendations based on Edward Luttwak's concept of relational maneuver. Luttwak defines relational maneuver as a style of warfare that requires deep understanding of the threat and its operational environment to identify vulnerabilities, adapt, and exploit those weaknesses to destroy an enemy system. Luttwak argues that irregular warfare requires effective implementation of relational maneuver to achieve operational and strategic success. The U.S. military's experiences in irregular warfare have revealed insufficient use of relational maneuver, favoring, instead, employment of attrition warfare, which focuses on optimizing internal organizational efficiency without understanding, or adapting to, the threat or the operational environment. Through this research, the authors ask **how should MARSOC better implement relational maneuver to wage irregular warfare more effectively and achieve strategically successful outcomes?**



MARSOC'S Path to Strategically Implement Relational Maneuver

The "So What"

- In irregular warfare, political competition permeates from the strategic down to the most tactical levels of warfare
- This study's research reveals historical U.S. deficiencies in waging irregular warfare
- MARSOC can best achieve strategic relevance and utility by employing indirect irregular warfare approaches to influence and support national-level objectives against prioritized threat networks and within select operational environments

AN OPERATOR'S PERSPECTIVE

Lieutenant Colonel Clayton Schuety, U.S. Air Force

"Attending NPS gave me the time and space to refine my own perspectives, beliefs, and values regarding what it means to be a SOF professional."

Lieutenant Colonel Clayton Schuety, U.S. Air Force
Master's in Defense Analysis

NPS provided a fantastic opportunity for me to immerse myself in the study of special operations and conduct academic research relevant to service as an Air Force Special Operations Command (AFSOC) officer.

My experience at NPS has already proved valuable to me as the Director of Operations for the 19th Special Operations Squadron (SOS), the formal training unit (FTU) responsible for initial mission qualification training on many aircraft. In my new role, I have already started to analyze what it means to be an Air Commando. As I discuss our identity as a community with members my squadron, I found myself referencing material covered while at NPS. Specifically, I draw from content covered in courses such as the History of SOF, Psychological Warfare, American Approaches to Small Wars, Guerilla Warfare, Ethical Decision Making, and Stoic Philosophy and the discussions spurred by those subjects both in and out of our classroom. Having exposure to these perspectives has rounded out my previous experiences in AFSOC with a depth and breadth of insight from around the SOF community and academia. This insight has proven invaluable for me in developing my leadership and management plans for growing the next generation of AFSOC Air Commandos.

From my perspective, the mid-career officers and NCOs go to principle staff positions or directly into leadership roles within their respective SOF component should come straight from NPS. For me, NPS was tremendously valuable in preparing me to serve as the 19th SOS's Director of Operations. Leading SOF professionals and having a hand in bringing up the next generation of Air Commandos is a tremendous opportunity and responsibility. Attending NPS gave me the time and space to refine my own perspectives, beliefs, and values regarding what it means to be a SOF professional. NPS also gave me the opportunity to integrate this view well beyond just the tactical picture I came with, and into the operational and strategic levels of warfare. I think this is particularly important when great power competition has returned to center stage and SOF is tasked to adapt to new and different missions. In such a time, it is good to know who you are and where your strategic utility lies.

STUDENT THESIS SPOTLIGHT

The American Way of Swarm: A Machine Learning Strategy for Training Autonomous Systems

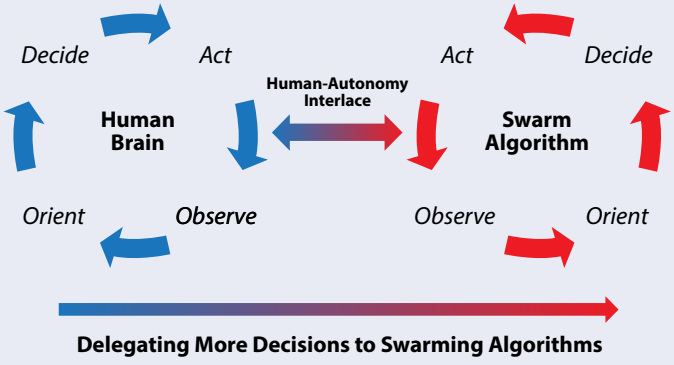
Research Question:
How can wargames and machine learning be combined to train a decentralized swarm of autonomous systems, thereby enhancing the human-autonomy team?

I	II	III	IV	V
Requirements:	***Create:***	***Train:***	***Validate:***	***Operate:***
Form industry-military partnership to develop an array of mission-specific swarm wargames	Integrate wargames with machine learning that enables direct access into the wargame agents	Mission-Specific Training Game Environment + Cloud Computing; Artificial Intelligence (A.I.)	Perform robust sensitivity testing as well as real-world field evaluation	Distribute the AI trained algorithm across a swarm of autonomous systems

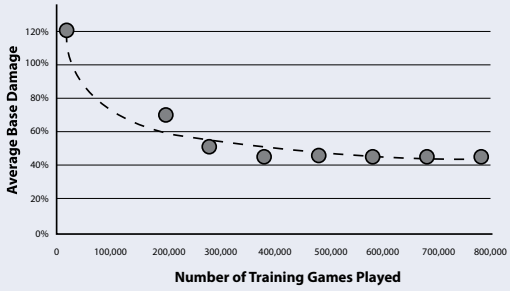
Major Findings:

Algorithms (beyond operators) as a training priority Designing future wargames for AI integration Demand to operationalize decentralized swarms

- Base defense (find, fix, track hostile actors)
- Undersea vehicle patrols (limited data-links)
- Collateral scans for kinetic strikes



*The experimental design used **780,000 iterations** of the wargame, conducted over **two days**, evolving both BLUFOR and REDFOR for **over 30 generations***



THE END RESULT

When leadership empower an institution to be successful, and the individual components of that organization meld into a unified force, something significant happens. Across the university campus, the term often proposed to identify this powerful force is synergy.

Long gone from the mouths of the beltway bandits in the District, or the DINKs of Silicon Valley closer to home, synergy is a term not poised to inspire. But it's embodiment of the tried and true adage, that the "whole is greater than the sum of its parts," cannot be undervalued.

At NPS, the confluence of a senior leader's concise vision and a detailed strategic plan joins forces with the resident expertise of some of our nation's finest scholars. And the results lead to unmatched opportunities for our students, who truly represent the critical catalyst. Seasoned military officers from across the DOD with multiple tours behind them bring an experience level in the student body that is simply unmatched, anywhere.

The end result of this amalgam is an environment that truly empowers our students to apply their experience, education and innovative spirit to real-world defense challenges and issues. An impromptu participation in the Army Futures Command's first hackathon is a perfect example.

Two weeks out from the November 2018 event, A Hack of the Drones, Army Col. Michael Richardson, NPS SOF Chair, caught wind of the event from a colleague.

"He told me if we didn't show up with a team, we'd be missing an opportunity to showcase the value proposition of what our officers are doing at NPS," Richardson noted. "So I said, 'You're right. I'm going to get a team together and we're going to Austin.'"

Within a handful of days, Richardson's base team – defense analysis students Air Force Lt. Col. Clay Schuety and Maj. Lucas Will, Army Maj. Jon Munson, Marine Corps Capt. Caliph Lebrun from electrical engineering, and Navy Lt. Todd Coursey from the physics department – was in Austin, briefing Hackathon judges on an impressive solution to countering unmanned systems.

"Only at NPS can you get an ad hoc team of highly experienced, capable and intelligent career military professionals together who, on short notice, can fuse together, work through a solution, and present it to the most senior levels of the service and get buy-in," Richardson said.

And he was right ... They won. But, as Schuety notes, their results are not necessarily unique on a campus like NPS.

"I think this reflects really, really well on NPS as a research institution," Schuety explained. "We're primarily here at NPS for research opportunities and to go back to the force more lethal and ready to solve our nation's problems, but our victory also highlights a really interesting part about NPS.

"That's what really enabled us [to bring] a unique perspective down there in Austin," he continued. "I think it highlighted everything that NPS is doing, and that is incredible."

> *"Only at NPS can you get an ad hoc team of highly experienced, capable and intelligent career military professionals together who, on short notice, can fuse together, work through a solution, and present it to the most senior levels of the service and get buy-in."*
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> -Army Col. Michael Richardson

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